Open Questions In Electron Cyclotron Wave Theory

Representatives of several scientific communities, such as planetary scientists, astronomers, space physicists, chemists and astrobiologists have met with the aim to review the knowledge on four major themes: (1) the study of the formation and evolution processes of the outer planets and their satellites, beginning with the formation of compounds and planetesimals in the solar nebula, and the subsequent evolution of the interiors of the outer planets, (2) a comparative study of the atmospheres of the outer planets and Titan, (3) the study of the planetary magnetospheres and their interactions with the solar wind, and (4) the formation and properties of satellites and rings, including their interiors, surfaces, and their interaction with the solar wind and the magnetospheres of the outer planets. Beyond these topics, the implications for the prebiotic chemical evolution on Europa and Titan are reviewed. At the time of publication, the study of the outer planets is particularly motivated by the fact that the Saturn system is being investigated by the Cassini-Huygens mission.

The aurora is the most visible manifestation of the connection of the Earth to the space environment and has inspired awe, curiosity, and scientific inquiry for centuries. Recent advances in observing techniques and modeling and theoretical work have revealed new auroral phenomena, provided a better understanding of auroral dynamics, and have led to an enhanced capability for auroral forecasts. This monograph features discussions of: New auroral phenomena due to the ring current ion and polar rain electron precipitation Various auroral forms and hemispheric asymmetry Auroral model development and MHD simulations Application of the auroral observations for radio absorption and scintillation Aurora nowcast and forecast for space weather operations Auroral Dynamics and Space Weather is a valuable contribution for scientists, researchers, space weather operators, and students of Earth's space environment.

These proceedings present the latest results in electron cyclotron emission, heating and current drive, with an emphasis on the physics and technology of Electron Cyclotron Emission, Electron Cyclotron Heating and Electron Cyclotron Current Drive applied to magnetic fusion research. The field is a key element in the development of fusion power and the ITER project now under construction.

Electron Cyclotron Emission and Electron Cyclotron Heating

Dynamics of the Earth's Radiation Belts and Inner Magnetosphere

Active Control of Magneto-hydrodynamic Instabilities in Hot Plasmas

University Physics

Introduction to the Physics of Gyrotrons

The Outer Planets and their Moons

It should appeal to plasma physicists interested in charged-particle dynamics, as well as to applied physicists needing to know more about micro- and millimeter-wave technologies.

Low-frequency waves in space plasmas have been studied for several decades, and our knowledge gain has been incremental with several paradigm-changing leaps forward. In our solar system, such waves occur in the ionospheres and magnetospheres of planets, and around our Moon. They occur in the solar wind, and more recently, they have been confirmed in the Sun’s atmosphere as well. The goal of wave research is to understand their generation, their propagation, and their interaction with the surrounding plasma. Low-frequency Waves in Space Plasmas presents a concise and authoritative up-to-date look on where wave research stands: What have we learned in the last decade? What are unanswered questions? While in the past waves in different astrophysical plasmas have been largely treated in separate books, the unique feature of this monograph is that it covers waves in many plasma regions, including: Waves in geospace, including ionosphere and magnetosphere Waves in planetary magnetospheres Waves at the Moon Waves in the solar wind Waves in the solar atmosphere Because of the breadth of topics covered, this volume should appeal to a broad community of space scientists and students, and it should also be of interest to astronomers/astrophysicists who are studying space plasmas beyond our Solar System.

In the 300 years since Newton’s seminal work, physics has explained many things that used to be mysterious. Particularly in the last century, physics has addressed a range of questions, from the smallest fundamental particles to the large-scale structure and history of the entire universe. But there are always more questions. Suitable for a wide audience, Commonly Asked Questions in Physics covers a broad scope of subjects, from classical physics that goes back to the age of Newton to new ideas just formulated in the twenty-first century. The book highlights the core areas of physics that predate the twentieth century, including mechanics, electromagnetism, optics, and thermodynamics. It also focuses on modern physics, covering quantum mechanics, atomic and nuclear physics, fundamental particles, and relativity. Each chapter explains the numbers and units used to measure things and some chapters include a "Going Deeper" feature that provides more mathematical details for readers who are up to the challenge. The suggested readings at the end of each chapter range from classic textbooks to some of the best books written for the general public, offering readers the option to study the topic in more depth. Physics affects our lives nearly every day—using cell phones, taking x-rays, and much more. Keeping the mathematics at a very basic level, this accessible book addresses many physics questions frequently posed by physics students, scientists in other fields, and the wider public.

Physics of the Jovian Magnetosphere

Boundary Layers, Waves and Non-linear Dynamical Processes

Particle Acceleration and Trapping in Solar Flares

Selected Contributions to the Workshop held at Aubigny-sur-Nère (Bourges), France, June 23–26, 1986

Yosemite National Park, California, USA, 10-13 March 2008

High Density Plasma Sources

Large edge localized modes (ELMs) typically accompany good H-mode confinement in fusion devices, but can present problems for plasma facing components because of high transient heat loads. Here the range of techniques for ELM control deployed in fusion devices is reviewed. The two baseline strategies in the ITER baseline design are emphasized: rapid ELM triggering and peak heat flux control via pellet injection, and the use of magnetic perturbations to suppress or mitigate ELMs. While both of these techniques are moderately well developed, with reasonable physical bases for projecting to ITER, differing observations between multiple devices are also discussed to highlight the needed community R & D. In addition, recent progress in ELM-free regimes, namely Quiescent H-mode, I-mode, and Enhanced Pedestal H-mode is reviewed, and open questions for extrapolability are discussed. Finally progress and outstanding issues in alternate ELM control techniques are reviewed: supersonic molecular beam injection, edge electron cyclotron heating, lower hybrid heating and/or current drive, controlled periodic jogs of the vertical centroid position, ELM pace-making via periodic magnetic perturbations, ELM elimination with lithium wall conditioning, and naturally occurring small ELM regimes.

The objective of the Symposium on Fusion Technology (SOFT) conference is to set the stage for the exchange of information on the design, construction, and operation of fusion experiments and the technology which is being developed for the next-step devices and for fusion reactors. These proceedings therefore present an up-to-date and throrough review of the state-of-the art in this dynamic field.

These proceedings review the progress in most aspects of semiconductor physics, including those related to materials, processing and devices. The conference continues the tradition of the ICPS series and these volumes include state-of-the-art lectures. The plenary and invited papers address areas of major interest.These volumes will serve as excellent material for researchers in semiconductor physics and related fields.

Background Processes in the Electrostatic Spectrometers of the KATRIN Experiment

Auroral Dynamics and Space Weather

Low-Frequency Waves in Space Plasmas

Fusion Technology 1994

Active Experiments in Space: Past, Present, and Future

Fusion Science and Technology

The Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) is a NASA Explorer mission that is the first space mission dedicated to imaging of the Earth's magnetosphere. IMAGE was launched from Vandenberg AFB into an elliptical polar orbit by a Delta II launch vehicle on March 25, 2000. The two-year prime sci entific mission of IMAGE began on May 25, 2000 after instrument commissioning was successfully completed. IMAGE has now been approved for operation until October 1,2005, and an additional two-year extension is now being considered by NASA. The papers in this volume represent many of the scientific results obtained dur ing the IMAGE prime mission and include some of the early correlative research with ground-based measurements, measurements from other spacecraft such as Cluster II, and relevant theory and modeling programs. All of the reported work is related to the overall IMAGE science objective: How does the magnetosphere respond globally to the changing conditions in the solar wind? IMAGE addresses this question with multi-spectral imaging of most of the important plasma pop ulations of the inner magnetosphere, combined with radio sounding of gradients of total plasma content. The new experimental techniques fall into the following areas: neutral atom imaging (NAI) over an energy range from 10 eV to 500 keY for detection of ionospheric outflow, the plasma sheet, and the ring current; far ultraviolet (FUV) imaging at 121-190 nm for detection of precipitating protons and the global aurora; extreme ultraviolet (EUV) imaging at 30.

During the past century, world-wide energy consumption has risen dramatically, which leads to a quest for new energy sources. Fusion of hydrogen atoms in hot plasmas is an attractive approach to solve the energy problem, with abundant fuel, inherent safety and no long-lived radioactivity. However, one of the limits on plasma performance is due to the various classes of magneto-hydrodynamic instabilities that may occur. The physics and control of these instabilities in modern magnetic confinement fusion devices is the subject of this book. Written by foremost experts, the contributions will provide valuable reference and up-to-date research reviews for "old hands" and newcomers alike.

This book is a snapshot of the vision shared by outstanding scientists on the key theoretical and experimental issues in Mesoscopic Physics. Quantum properties of electrons in solid state devices and transport in semiconducting and superconducting low-dimensional systems, are discussed, as well as the basis of quantum computing (entanglement, noise decoherence and read-out). Each chapter collects the material presented at a Varenna School course of last year, by leading experts in the field. The reader gets a flavor, how theorists and experimentalists are paving the way to the physical realization of solid state qubits, the basic units of the new logic and memory elements for quantum processing. He will be surprised in finding that mesoscopic solid state devices, which were invented just yesterday (think of the Single Electron Transistor, or the Cooper Pair Box) are currently used as charge-sensing applications in the equipment of frontier research laboratories. These devices contribute as probing systems to produce evidence on still unsettled questions in topics like the metal-insulator transition in disordered two dimensional systems, quantum Hall conductance in heterostructures, or Kondo conductance in quantum dots.

Electron Cyclotron Emission and Electron Cyclotron Resonance Heating (EC-15)

Comparative Studies of the Outer Planets prior to the Exploration of the Saturn System by Cassini-Huygens

Crystals, Electrons, Transistors

Basic Concepts

Third European Particle Accelerator Conference : Berlin, 24-28 March, 1992

16th International Workshop on ECR Ion Sources, ECRIS '04

"University Physics is a three-volume collection that meets the scope and sequence requirements for two- and three-semester calculus-based physics courses. Volume 1 covers mechanics, sound, oscillations, and waves. This textbook emphasizes connections between theory and application, making physics concepts interesting and accessible to students while maintaining the mathematical rigor inherent in the subject. Frequent, strong examples focus on how to approach a problem, how to work with the equations, and how to check and generalize the result."--Open Textbook Library.

A survey of the machinery and science of the nanometer scale. Its twenty-two contributing authors, drawn from many different disciplines including atomic physics, microelectronics, polymer chemistry, and biophysics, delineate the course of current research and articulate a vision for the development of the nanometer frontiers in electronics, mechanics, chemistry, magnetics, materials, and biology. They reveal a world thirty years hence where motors are smaller than the diameter of a human hair; where single-celled organisms are programmed to fabricate materials with nanometer precision; where single atoms are used for computation, and where quantum chaos is the norm. Aimed at the level of at least a junior- or senior- level undergraduate in biology, chemistry, physics, or engineering.

Acknowledged as the "founding father" of and world renowned expert on electron cyclotron resonance sources Richard Geller has produced a unique book devoted to the physics and technicalities of electron cyclotron resonance sources. Electron Cyclotron Resonance Ion Sources and ECR Plasmas provides a primer on electron cyclotron phenomena in ion sour

Scientific and Technical Aerospace Reports

Helical System Research

Physics Of Semiconductors, The - Proceedings Of The 22nd International Conference (In 3 Volumes)

Magnetospheric Current Systems

Cold-Ion Populations and Cold-Electron Populations in the Earth’s Magnetosphere and Their Impact on the System

Quantum Phenomena in Mesoscopic Systems

Neutrinos continue to be the most mysterious and, arguably, the most fascinating particles of the Standard Model as their intrinsic properties such as absolute mass scale and CP properties are unknown. The open question of the absolute neutrino mass scale will be addressed with unprecedented accuracy by the Karlsruhe Tritium Neutrino (KATRIN) experiment, currently under construction. This thesis focusses on the spectrometer part of KATRIN and background processes therein. Various background sources such as small Penning traps, as well as nuclear decays from single radon atoms are fully characterized here for the first time. Most importantly, however, it was possible to reduce the background in the spectrometer by more than five orders of magnitude by eliminating Penning traps and by developing a completely new background reduction method by stochastically heating trapped electrons using electron cyclotron resonance (ECR). The work beautifully demonstrates that the obstacles and challenges in measuring the absolute mass scale of neutrinos can be met successfully if novel experimental tools (ECR) and novel computing methods (KASSIOPEIA) are combined to allow almost background-free tritium ß-spectroscopy.

Berkeley, California, 26-30 September 2004

Principles and Practice of Particle Therapy Although radiation has been used therapeutically for over 100 years, the field of radiation oncology is currently in the midst of a renaissance, particularly with regards to the therapeutic use of particles. Over the past several years, access to particle therapy, whether it be proton therapy or other heavy ion therapy, has increased dramatically. Principles and Practice of Particle Therapy is a clinically oriented resource that can be referenced by both experienced clinicians and those who are just beginning their venture into particle therapy. Written by a team with significant experience in the field, topics covered include: Background information related to particle therapy, including the clinically relevant physics, radiobiological, and practical aspects of developing a particle therapy program “Niche” treatments, such as FLASH, BNCT, and GRID therapy The simulation process, target volume delineation, and unique treatment planning considerations for each disease site Less commonly used ions, such as fast neutrons or helium Principles and Practice of Particle Therapy is a go-to reference work for any health professional involved in the rapidly evolving field of particle therapy.

Commonly Asked Questions in Physics

Encyclopedia of Plasma Technology - Two Volume Set

Electron Cyclotron Resonance Ion Sources and ECR Plasmas

An International Journal of the American Nuclear Society

EPAC 92

Principles and Practice of Particle Therapy

A valuable reference work for those doing research in magnetospheric physics and related disciplines.

These are the Proceedings of the Second CESRA Workshop on Particle Acceleration and Trapping in Solar Flares. The Workshop was held on June 23-26,1986, at the city hall of Aubigny-sur-Nere (France), near Bourges and near the Nan

Electron Cyclotron Emission and Electron Cyclotron Resonance Heating (EC-15)Proceedings of the Fifteenth Joint Workshop on Electron Cyclotron Emission and Electron Cyclotron Resonance HeatingYosemite National Park, California, USA, 10-13 March 2008World Scientific

Nuclear Science Abstracts

Nanotechnology

Proceedings of Joint Conference of 11th International Stellarator Conference (ISC-11) & 8th International Toki Conference on Plasma Physics and Controlled Nuclear Fusion (ITC-8) : September 29-October 3, 1997, Toki-city, Japan

Dynamics During Spectroscopic Transitions

Magnetospheric Imaging — The Image Prime Mission

"How does a photon get into an atom?" This question - fundamental to quantum mechanics - puzzled leading scientists such as Schrödinger and Heisenberg and is still asked by students. James D. Macomber's book was the first to provide a didactic and unified approach to the answer, which has now been updated by way of recent experimental results and modern theoretical interpretations written by leading scientists. It provides an understanding for similarities among the spectroscopic methods available and is stimulating to read, reflecting the excitement of scientific research.

This book describes the design, physics, and performance of high density plasma sources which have been extensively explored in low pressure plasma processing, such as plasma etching and planarization, plasma enhanced chemical vapor deposition of thin films, sputtered deposition of metals and dielectrics, epitaxial growth of silicon and GaAs, and many other applications. This is a comprehensive survey and a detailed description of most advanced high density plasma sources used in plasma processing. The book is a balanced presentation in that it gives both a theoretical treatment and practical applications. It should be of considerable interest to scientists and engineers working on plasma source design, and process development.

Published by the American Geophysical Union as part of the Geophysical Monograph Series, Volume 118. The magnetosphere is an open system that interacts with the solar wind. In this system, solar wind energy continuously permeates different regions of the magnetosphere through electromagnetic processes, which we can well describe in terms of current systems. In fact, our ability to use various methods to study magnetospheric current systems has recently prompted significant progress in our understanding of the phenomenon. Unprecedented coverage of satellite and ground?]based observations has advanced global approaches to magnetospheric current systems, whereas advanced measurements of electromagnetic fields and particles have brought new insights about micro?]processes. Increased computer capabilities have enabled us to simulate the dynamics not only of the terrestrial magnetosphere but also the magnetospheres of other planets. Based on such developments, the present volume revisits outstanding issues about magnetospheric current systems.

Interplay of Spins, Charges and Photons in Low-dimensional Systems

Design, Physics and Performance

Enhanced Confinement Scenarios Without Large Edge Localized Modes in Tokamaks

The Solar Maximum Mission Flare Workshop Proceedings

Control, Performance, and Extrapolability Issues for ITER.

Proceedings of the Fifteenth Joint Workshop on Electron Cyclotron Emission and Electron Cyclotron Resonance Heating

Technical plasmas have a wide range of industrial applications. The Encyclopedia of Plasma Technology covers all aspects of plasma technology from the fundamentals to a range of applications across a large number of industries and disciplines. Topics covered include nanotechnology, solar cell technology, biomedical and clinical applications, electronic materials, sustainability, and clean technologies. The book bridges materials science, industrial chemistry, physics, and engineering, making it a must have for researchers in industry and academia, as well as those working on application-oriented plasma technologies. Also Available Online This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail) online.sales@tandf.co.uk

Published by the American Geophysical Union as part of the Geophysical Monograph Series, Volume 199. Dynamics of the Earth's Radiation Belts and Inner Magnetosphere draws together current knowledge of the radiation belts prior

to the launch of Radiation Belt Storm Probes (RPSP) and other imminent space missions, making this volume timely and unique. The volume will serve as a useful benchmark at this exciting and pivotal period in radiation belt research in advance of the new discoveries that the RPSP mission will surely bring. Highlights include the following: a review of the current state of the art of radiation belt science; a complete and up-to-date account of the wave-particle interactions that control the dynamical acceleration and loss processes of particles in the Earth's radiation belts and inner magnetosphere; a discussion emphasizing the importance of the cross-energy coupling of the particle populations of the radiation belts, ring current, and plasmasphere in controlling the dynamics of the inner magnetosphere; an outline of the design and operation of future satellite missions whose objectives are to discover the dominant physical processes that control the dynamics of the Earth's radiation belts and to advance our level of understanding of radiation belt dynamics ideally to the point of predictability; and an examination of the current state of knowledge of Earth's radiation belts from past and current spacecraft missions to the inner magnetosphere. Dynamics of the Earth's Radiation Belts and Inner Magnetosphere will be a useful reference work for the specialist researcher, the student, and the general reader. In addition, the volume could be used as a supplementary text in any graduate-level course in space physics in which radiation belt physics is featured.

Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.

Energetic Phenomena on the Sun

Energy Research Abstracts

Electron Cyclotron Resonance Ion Sources

NASA Technical Report